APRIL/MAY 2025

FEL21/CEL21 — ELECTROMAGNETISM AND AC CIRCUITS

Time : Three hours Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

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1. What is solenoid?
2. Define coefficient of coupling.
3. What do you meant by RMS value?
4. Define power factor.
5. State the function of a transformer.
6. What is decay current?
7. What is star connection?
8. Distinguish between the alternating current over direct current.
9. State Faraday's law.
10. Define Ampere's circuital law.

SECTION B — (5 × 5 = 25 marks)

Answer ALL questions.

11. (a) Derive the expression for coefficient of self induction of a solenoid.

Or

(b) Write short on eddy current and its uses.

12. (a) Derive the expression for power factor of capacitance in an ac circuit.

Or

(b) Calculate the peak value of alternating current.

13. (a) What is Tesla coil? List out the transformer losses.

Or

(b) Derive the expression for time constant for LR circuit.

14. (a) Compare star and delta connections in an ac circuit.

Or

(b) Differentiate the series and shunt dynamos.

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15. (a) Explain the Gauss law in electrostatics and magnetostatics.

Or

(b) Derive an expression for Ampere's force law.

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Describe the method to determine mutual inductance of two coils.

17. Discuss the power factor of an AC circuit containing resistance, inductance and capacitance in series.

18. Explicate the growth and decay of the current in a circuit having LCR.

19. Illustrate the construction and working principle of DC motor.

20. Derive and explain any two Maxwell's equation in differential form.

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